Autonomic Computing At Improving Banking Delivery System

Syamsiah Mahzan @ Mohd Zin

84864

Universiti Utara Malaysia 2009

A Thesis submitted to College of Arts & Sciences in partial fulfillment of the requirement for the degree Master Science of Information Technology (MScIT) Universiti Utara Malaysia

KOLEJ SASTERA DAN SAINS
(College of Arts and Sciences)
Universiti Utara Malaysia

PERAKUAN KERJA KERTAS PROJEK
(Certificate of Project Paper)

Saya, yang bertandatangan, memperakukan bahawa
(I, the undersigned, certify that)

SYAMSIAH MAHZAN @ MOHD ZIN
(84864)

calon untuk Ijazah
(candidate for the degree of) **MSc. (Information Technology)**

telah mengemukakan kertas projek yang bertajuk
(has presented his/her project paper of the following title)

AUTONOMIC COMPUTING AT IMPROVING BANKING DELIVERY SYSTEM

seperti yang tercatat di muka surat tajuk dan kulit kertas projek
(as it appears on the title page and front cover of project paper)

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu dengan memuaskan.
(that the project paper acceptable in form and content, and that a satisfactory knowledge of the field is covered by the project paper).

Nama Penyelia Utama
(Name of Main Supervisor): **MR. ABDUL RAZAK RAHMAT**

Tandatangan
(Signature) : _____

Tarikh
(Date) : 3/12/2009

PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirement for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of the College of Arts and Sciences. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that any due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis. Requests for permission to copy or to make other use of materials in this thesis, in

whole or in part, should be addressed to

Dean of College of Arts and Sciences

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman.

ABSTRACT

Autonomic computing which promotes self-healing, self-configuring, self-optimizing, and self-protecting hardware and software that behaves in accordance to defined service levels and policies is paramount in banking industry given its complexity of computerized environment. By autonomic computing, it would automate inefficient manual processes taken by system administrators to administer and troubleshoot that would take longer time and efforts to resolve and thus helping to improve in delivering better banking system. However, the challenge to establish autonomic computing is not just from the infrastructure itself but it may also undermine job security of network administrators who have already served the banking industry.

ACKNOWLEDGEMENT

Alhamdullillah, praise be to Allah S.W.T The Most Gracious and Most Merciful, for giving me the opportunity to complete this thesis. The issue is relatively new and challenging but it remains closely related to my career as field service engineer who support banking network and system.

I wish to extend my grateful to my supervisor, En Abdul Razak Rahmat for his generosity to give me ample freedom to conduct and to complete this thesis. Many thanks for his understanding, support and guidance.

I would also like to thank my husband, Mohd 'Atef Md Yusof for being supportive and understanding, Insya Allah, we will be on stage together. I extend my gratitude to Allah S.W.T for giving beautiful and lovely children, Fawza, Marissa, Muhammad Safwan and Noryn Rania. I am very blessed by their loves and affections.

I am also very grateful to my family, especially my mother, Hjh Hapipah Ibrahim and to my parent in law, En Md Yusof Yatim and Pn Maysarah Ahmad for their prayers, supports and understanding.

TABLE OF CONTENT

CHAPTER 2 : LITERATURE REVIEW

CHAPTER 3 : RESEARCH METHODOLOGY

CHAPTER 4 : FINDINGS

CHAPTER 5 : CONCLUSION AND LIMITATION OF RESEARCH

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Background

Banks nowadays offer a comprehensive range of financial services and products ranging from commercial banking, investment banking, Islamic banking, offshore banking, leasing and hire purchase, insurance, factoring, trustee services, asset management, stock broking, nominee services, venture capital and Internet banking. All these wide-ranging services induce complexity towards IT infrastructure including the networking framework, hardware and software capabilities and trained manpower.

In Maybank's latest annual report 2007 on page 63,

> "The Bank also continues to support many communities particularly in rural areasby providing financial services at locations where it may not always be profi table. We also continue to *expand our ATM network and internet banking portal, Maybank2u.com*, to enable the community to have banking access even in remote locations (emphasize added)".

As such, the idea of autonomic computing (AC hereafter) mooted by IBM in 2001 would offer improved stability and virtually uninterrupted (or at least minimal interruption) services to the banks. Thus, the idea behind AC does not lie on building latest IT infrastructure per se, but to some extent involves a different approach to IT infrastructure. IBM (2001) offers the following definition of AC,

The contents of the thesis is for internal user only

REFERENCE

Balasubramaniam S., D. Botvich, W. Donelly and M. O Foghlu (2006). Biologically Inspired Self-Governance and Self-Organisation for Autonomic Networks. ACM International Conference Proceeding Series, 275.

Bell, D.A. (1953), *Information Theory*, Pitman, London.

Bellman, R., (1957). *Dynamic Programming.* Princeton University Press, New Jersey.

Black, J., C. Draper, T. Lacoco, F. Matar and C. Ward (2007). An integration model for organizing IT service management. *IBM System Journal*, 46 (3), 405-422.

Chan, C., Kinsner, W., Wang, Y., & Miller, D. M. (Eds.). (2004). Cognitive informatics: Proceedings of the Third IEEE International Conference, (ICCI'04). Victoria, Canada: IEEE CS Press.

Dennis, A. B.H. Wixom and D. Tegarden (2005). *Systems Analysis and Design with UML Version 2.0.* Wiley International. New Jersey.

Dobson, S., S. Deynazis, A. Fernandez, D. Gaiti, E. Gelenbe, F. Massacci, P. Nixon, F. Saffre, N. Schmidt and F. Zambonelli (2006). A Survey of Autonomic Communications. *ACM Transactions on Autonomous and Adaptive Systems*, 1 (2), December 2006, 223–259.

Fink, G. & Frincke, D (2007). Autonomic Computing : Freedom or threat?. Available at www.usenix.org/publications/login/2007-04/openpdfs/fink.pdf.

Fink, G. (2007). Autonomic Computing Questionnaire. Available at http://surveyext.pnl.gov/cgi-bin/autonomic/ezs.exe?database=autonomic http://www.research.ibm.com/autonomic/research/papers/AC_Vision_Computer_Jan_2003.pdf.

Huebscher, M. C. and J. A. McCann (2008). A survey of autonomic computing—degrees, models, and applications. *ACM Computing Survey*, 40, 3, Article 7 (August 2008), 28 pages DOI = 10.1145/1380584.1380585 http://doi.acm.org/10.1145/1380584.1380585

IBM. (2001). IBM autonomic computing manifesto. Retrieved from http://www.research.ibm.com/autonomic/

IBM (2003). An architectural blueprint for autonomic computing. Retrieved:17 July 2009. From www.ginkgo networks.com/IMG/pdf/AC_**Blueprint**_White_Paper_V7.pdf

Kephart, J., & Chess, D. (2003). The vision of autonomic computing. IEEE Computer, 26(1), 41-50.

Kinsner, W. (2007). Towards cognitive machines: Multiscale measures and analysis. The International Journal on Cognitive Informatics and Natural Intelligence (IJCINI), 1(1), 28-38.

Kinsner, W., Zhang, D., Wang, Y., & Tsai, J. (Eds.). (2005). Cognitive informatics: Proceedings of the Fourth IEEE International Conference, (ICCI'05). Irvine, CA: IEEE CS Press.

Morris, R. (2002). Autonomic Computing. Availabe at www.almaden.ibm.com/almaden/talks/Morris_AC_10-02.pdf.

Murch, R. (2004). Autonomic computing. London: Person Education.

Patel, D., Patel, S., & Wang, Y. (Eds.). (2003). Cognitive informatics: Proceedings of the Second IEEE International Conference (ICCI'03). London: IEEE CS Press.

Patouni E. and N. Alonistioti (2006). A Framework for the Deployment of Self-Managing and Self-Configuring Components in Autonomic Environments. Available at portal.acm.org/ft_gateway.cfm?id=1139447&type=pdf

Pescovitz, D. (2002). Autonomic computing: Helping computers help themselves. IEEE Spectrum, 39(9), 49-53.

Pontryagin, L.S., Boltyansky, V.G., Gamkrelidze, R.V., Mishchenko, E.F., (1962) *The Mathematical Theory of Optimal Processes*. Wiley, New York

Rocha, A. R., F. C. Delicato, J. N. deSouza, D. G. Gomez and L. Pirmez (2009). *A Semantic Middleware for Autonomic Wireless Sensor Networks*. ACM, 19-25.

Salehie, M and L. Tahvildari (2005). Autonomic Computing: Emerging Trends and Open Problems. ACM, 1-7.

Shannon, C.E. (1948), A Mathematical Theory of Communication, *Bell System Technical Journal*,.27, 379-423 and 623-656.

Wang, Y. (2004). Keynote speech: On autonomic computing and cognitive processes. In Proceedings of the Third IEEE International Conference on Cognitive Informatics (ICCI'04) (pp. 3-4). Victoria, Canada: IEEE CS Press.

Wang, Y. (2006b). On abstract systems and system algebra. In Proceedings of the Fifth IEEE International Conference on Cognitive Informatics (ICCI'06) (pp. 332-343). Beijing, China: IEEE CS Press.

Wang, Y. (2007b). Towards the theoretical foundations of autonomic computing. *The International Journal of Cognitive Informatics and Natural Intelligence*, 1(3), 1-15.

Wang, Y. (2006a). Keynote speech: Cognitive informatics - Towards the future generation computers that think and feel. In Proceedings of the Fifth IEEE International Conference on Cognitive Informatics (ICCI'06) (pp. 3-7). Beijing, China: IEEE CS Press.

Wang, Y. (2006c). On concept algebra and knowledge representation. In Proceedings of the Fifth IEEE International Conference on Cognitive Informatics (ICCI'06) (pp. 320-

331). Beijing, China: IEEE CS Press.

Wang, Y. (2007a). The theoretical framework of cognitive informatics. *The International Journal of Cognitive Informatics and Natural Intelligence*, 1(1), 1-27.

Wang, Y., & Kinsner, W. (2006). Recent advances in cognitive informatics. IEEE *Transactions on Systems, Man, and Cybernetics* (C), 36(2), 121-123.

Wang, Y., Johnston, R., & Smith, M. (Eds.). (2002). Cognitive informatics: Proceedings of the First IEEE International Conference (ICCI'02). Calgary, AB, Canada: IEEE CS Press.

Wang, Y., Wang, Y., Patel, S., & Patel, D. (2006). A Layered Reference Model of the Brain (LRMB). IEEE Transactions on Systems, Man, and Cybernetics (C), 36(2), 124-133.

Want, R. T. Pering and D. Tennenhouse (2003). Comparing autonomic and proactive computing. *IBM Systems Journal*, 42 (1), 129-135.

Yao, Y., Shi., Z., Wang, Y., & Kinsner, W. (Eds.). (2006). Cognitive informatics: Proceedings of the Fifth IEEE International Conference (ICCI'06) (Vols. I and II). Beijing, China: IEEE CS Press.

Zhang, X., V. Lesser, and R. Podorozhny (2005). Multi-dimensional,multistep negoriation for task allocation in a cooperativesystem. Autonomous Agents and Multi-Agent Systems, 10:5–40.